IN THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of the Claims:

1. (Currently amended) A method of separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, each source signal having a respective period similar or equal to p, the method comprising using a computer apparatus to perform the steps of:
   (a) expressing the composite signal as a matrix $[[X]]$ having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet;
   (b) implementing a decomposition of the matrix $[[X]]$ by decorrelation and normalisation to obtain decomposition results; and
   (c) performing independent component analysis (ICA) of the decomposition results to obtain at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets.

2. (Previously presented) A method according to Claim 1 including the step of estimating source signal period p by synchronous averaging of the composite signal.

3. (Currently amended) A method according to Claim 1 wherein the decomposition is a singular value decomposition generating decomposition results comprising two singular vector matrices and a singular value matrix, and the step of performing ICA ~~is carried out using~~uses one of the singular vector matrices to obtain a rotation matrix and calculates at least one of an independent component matrix and an associated component matrix one of which matrices contains estimated separated signal modulation envelopes and the other contains estimated separated cyclets.

4. (Cancelled)

5. (Currently amended) A method according to Claim 3 wherein the signal modulation envelopes are more statistically independent than the cyclets and step (c) ~~is performed on~~ includes processing a singular vector matrix $[[U]]$ of signal amplitudes to obtain a rotation matrix and calculating an independent component matrix $[[UR_2^T]]$ containing estimated separated signal envelopes and a matrix $[[R_2\lambda V]]$ containing estimated separated cyclets.

6. (Currently amended) A method according to Claim 3 wherein the cyclets are more statistically independent than the signal envelopes and step (c) ~~is performed on~~ includes processing a singular vector matrix $[[V]]$ of cyclets to obtain a rotation matrix and calculating an independent component matrix $[[R_1^T V]]$ containing estimated separated cyclets and a matrix $[[U\lambda R_1]]$ containing estimated separated signal envelopes.

7. (Cancelled)

8. (Cancelled)

9. (Cancelled)

10. (Previously presented) A method according to Claim 1 wherein the composite signal is detected by a single sensor.

11. (Currently amended) A method according to Claim 1 including detecting the source signals using a plurality of sensors each of which provides a respective composite signal from which a respective matrix $[[X]]$ is obtained and analysed in steps (a) to (c).

12. (Currently amended) A method according to Claim 1 including detecting the source signals using a plurality of sensors providing respective composite signals, and the matrix $[[X]]$ is obtained from the composite signals collectively.

13. (Previously presented) A method according to Claim 1 for apparatus condition monitoring, the source signals being obtained with the aid of at least one sensor from a plurality of

apparatus sources, and the at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets being analysed for indications as to the condition of respective apparatus sources.

14. (Currently amended) Computer apparatus for separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, the source signals having periodicities similar or equal to p, the computer apparatus being programmed to:
    (a) express the composite signal as a matrix $[[X]]$ having rows each of which is a respective segment of signal amplitude values and corresponding to a length of time associated with a signal cyclet;
    (b) decompose the matrix $[[X]]$ by decorrelation and normalisation to obtain decomposition results; and
    (c) perform independent component analysis (ICA) of the decomposition results to obtain at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets.

15. (Currently amended) Computer apparatus for separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, the source signals having periodicities similar or equal to p, and the computer apparatus being programmed to:
    (a) partition the composite signal into a plurality of partition matrices $[[X]]$ having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet;
    (b) perform a singular value decomposition (SVD) of at least one of the matrices $[[X]]$ to obtain two singular vector matrices $[[U, V]]$ and a singular value matrix$[[\lambda]]$;
    (c) estimate a true period p of the source signals from an average of data within rows of the partition matrices $[[X]]$; and
    (d) perform an independent component analysis to obtain a rotation matrix ~~of~~ using one of the singular vector matrices $[[U, V]]$ generated by SVD from the matrix $[[X]]$ partitioned in accordance with the estimated period p and ~~so to obtain~~ to calculate an independent component matrix ~~$UR_2^T R_1^T V$~~ and an associated component matrix ~~$R_2 \lambda V$, $U R_1$~~, one component matrix ~~UR_2^T, $U R_1$~~ containing estimated separated signal

modulation envelopes and the other $\boldsymbol{R_2\lambda V, R_1^T V}$ containing estimated separated cyclets.

16. (Currently amended) A computer-readable medium embodying instructions for execution by computer apparatus, the instructions relating to separation of a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, the source signals having periodicities similar or equal to p, and the computer-readable medium incorporating program code for controlling computer apparatus to:
    (a) express the composite signal as a matrix [[X]] having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet;
    (b) decompose the matrix [[X]] by decorrelation and normalisation to obtain decomposition results; and
    (c) perform ICA of the decomposition results to obtain at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets.

17. (Currently amended) A computer-readable medium embodying instructions for execution by computer apparatus, the instructions relating to separation of a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, the source signals having periodicities similar or equal to p, the computer-readable medium incorporating program code for controlling computer apparatus to:
    (a) partition the composite signal into sections to provide respective rows of a partition matrix [[X]];
    (b) perform a singular value decomposition of the matrix [[X]] to obtain two singular vector matrices [[U, V]] and a singular value matrix [[λ]]; and
    (c) perform an independent component analysis of one of the singular vector matrices [[U, V]] to obtain a rotation matrix and using the rotation matrix to calculate an independent component matrix $\boldsymbol{UR_2^T, R_1^T V}$ and an associated component matrix $\boldsymbol{R_2\lambda V, U\lambda R_1}$, one matrix $\boldsymbol{UR_2^T, U\lambda R_1}$ containing estimated separated signal modulation envelopes and the other matrix $\boldsymbol{R_2\lambda V, R_1^T V}$ containing estimated separated cyclets.

18. (Currently amended) A method of separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, each source signal having a respective period similar or equal to p, the method comprising using a computer apparatus to perform the steps of:

(a) expressing the composite signal as a trial matrix $[[X_{test}]]$ having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet with a trial period p',

(b) implementing a singular value decomposition of the trial matrix $[[X_{test}]]$ to generate two singular vector matrices and a singular value matrix, ~~each~~ the trial matrix $[[X_{test}]]$ having a probability associated with its decomposition; and

(c) iterating steps (a) and (b) for a series of different values of the trial period p' to generate multiple versions of the trial matrix $[[X_{test}]]$ and associated probabilities ~~for a series of different values of the trial period p'~~;

(d) performing independent component analysis (ICA) upon results obtained in the singular value decomposition of that version of the trial matrix $[[X_{test}]]$ associated with maximum probability and having signal cyclet of trial period p' taken to be the period p subject to this period not corresponding to a multiple of a true period.

19. (Currently amended) A method of separating a plurality of source signals from a composite signal expressed as a series of values of signal amplitude, each source signal having a respective period similar or equal to p, the method comprising using a computer apparatus to perform the steps of:

(a) expressing the composite signal as a matrix $[[X]]$ having rows each of which is a respective segment of signal amplitude values and corresponds to a length of time associated with a signal cyclet;

(b) implementing a decomposition of the matrix $[[X]]$ by decorrelation and normalisation to obtain decomposition results;

(c) estimating a number q of source signals with periodicities similar or equal to p present within the composite signal and reducing the decomposition results in accordance with such number; and

(d) performing independent component analysis (ICA) of the decomposition results to obtain at least one of estimated separated signal modulation envelopes and estimated separated signal cyclets.

20. (Previously presented) A method according to Claim 19 characterised in that the number q of source signals is estimated from the source signals' origins.

21. (Currently amended) A method according to Claim 19 characterised in that the number q of source signals is estimated from a number of elements of a singular value matrix[[λ]], the elements having values exceeding a threshold value.